**UNIVERSITY OF GHANA**

**SCHOOL OF ENGINEERING SCIENCES**

**DEPARTMENT OF COMPUTER ENGINEERING**

**PROJECT TITLE:** **SMART CITY USING LORAWAN**

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Date:

**Introduction**

The quality of life in cities with high percentage of people is at stake due overcrowding. The dissatisfaction with public transport, air quality, noise, retail outlet, green space, public administration and administrational efficiency is most frustrating.

This proposal outlines a plan to implement smart city using LoRaWAN to address these challenges and improve the quality of life for people. A smart city aims to bring various components together to live harmoniously and attempt to do with the least environmental impact. It raises the living standards of people and thrives on echo-friendly means. [define lorawam].

**Problem statement**

Air pollution is a major problem in cities. It has been tagged the most-pressing environmental health problem of our time, accounting for an estimated 7 million premature deaths every year. Approximately, nine out of ten people from around the world breathe unclean air, which heightens the risk of asthma, heart diseases and lung cancer. (UN Environment Programme, 2022).

Major cities around the world are facing significant challenges with their transportation system, including heavy traffic congestion, long commute times, and limited public transportation options. In Ghana, President Atta Mills surprised a mass crowd when he appeared late after trekking on foot through a jammed traffic, abandoning the presidential fleet of four BMWs and one four-wheel drive on the street during Eidul-Fitr celebration at El-Wak Sport Stadium in Accra. (Mahama, 2009).

Due to the large number of people in the cities, energy consumption is very high. Street lighting alone accounts for 15 - 40% of the overall energy consumed in standard cities worldwide. Energy efficiency determinations and design can reduce streetlighting cost by 35 - 70%. (Subramani, C., Surya, S., Gowtham, J., et al, 2019). The ability to implement such energy saving technologies will help to reduce the cost and the need for new generation plants.

The effect of bad weather conditions on agriculture can lead to food insecurity in the future. Climate change contributes substantially to food insecurity. Bad weather conditions lead to poor performance of crops and livestock, reducing food production and leading to increase in food and energy prices.

**Significance of the work**

The implementation of the smart city system will greatly improve the quality of life for people, businesses and corporations. It aims to monitor and address environmental concerns and air pollution. The system will provide traffic data that will be used to optimize traffic flow and reduce congestions, thereby leading to increased productivity. Also, it will provide information on air polluted areas and this will help people to avoid theses areas, which will eventually help to reduce the risk of diseases like asthma, heart diseases and lung cancer. It will enable management agencies to spot theses areas and put corrective measures in place.

The system will monitor and provide information on weather conditions like temperature, humidity and pressure. This data will help in the agricultural sector, where farmers will get real-time weather updates of location. This will enable farmers and other individuals to put measures in place and plan their daily activities. In so doing, it will increase agricultural productivity.

**Research and information gathering**

**Methodology**

**Design**

**Simulation**

**Conclusion**

The smart city system will address the significant challenges facing the city’s transportation system and will improve the quality of life for the citizens. The system will reduce traffic congestion, increase the efficiency of public transportation, improve energy conservation and efficiency, provide real-time update on temperature, humidity and pressure of various locations and improve air quality.

**References**

Mahama, A. (2009). Traffic catches Mills. Daily Guide, 22nd September, 2009.

Subramani, C., Surya, S., Gowtham, J., et al (June, 2019). AIP Conference Proceedings 2112, 020082. <https://doi.org/10.1063/5.0000594> .

UN Environment Programme (September, 2022). Five cities tackling air pollution. <https://www.unep.org/news-and-stories/stroy/five-cities-tackling-air-polution> .

National academy of engineering (2019). Intelligent transportation systems: Benefits and challenges.

World Economic Forum (2018). The future of transportation in smart cities.

National Highway Traffic Safety Administration (2017). Connected and automated vehicles: Opportunities and challenges.